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REMARKS

Reconsideration is respectfully requested in view of the amendments and remarks herein.

Restriction/Rejoinder

In paragraph 2, the Action states that claims 34-40 are withdrawn from further consideration as drawn to a non-elected invention. Applicant presents process claim 34 and other process claims herewith. Claim 34 depends from claim 11, and thus if claim 11 is considered allowable applicant respectfully requests that claim 34 be rejoined as described in MPEP821.04. Applicant submits that the other process claims are also appropriate for rejoinder.

35 USC 112

Claims 11-33 and 41 stand rejected under 35 USC 112, second paragraph.

The use of "glass laminate" in the preamble of Claim 11 is asserted to render the claim indefinite. Claim 11 is amended to refer to a glass layer.

Claims 11 and 33 are amended to recite " α, β -" as suggested by the Examiner.

Claims 12, 13-20, 22-24, 26 and 27 are stated to be indefinite because claim 11 refers to the thermoplastic sheet layers being in "direct" contact with the film. Applicant has deleted the word "direct" in claim 11 as supported in the paragraph at the bottom of page 2 of the application. That paragraph describes priming at least one layer and points to use of the primed layer in a laminate according to claim 11. Applicant submits that the claims are consistent with how these terms are used in describing primed films or layers in the art.

For consistency, Applicant has amended claims 33 and 40 in a similar manner to claim 11.

Claims 17, 18 and 20 are amended so that they are "glass laminate" claims as pointed out by the Examiner.

Claims 21-24 are amended to recite that the peel strength of the laminate is as measured by peeling one of the thermoplastic polymer sheets from the film. This amendment is supported by the disclosure at page 5, lines 17-28, which describe the 90° peel strength measurement as being determined by ASTM Standard D3330/D3330M-02 (using an Instrumentors, Inc., Model SP-102B-3M90 Slip/Peel Tester fitted with a MB-10 load cell) and Example 2 (last sentence) which describes measuring the 90° peel strength between the primed film and the ionoplast interlayer.

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Claims 28-30 are rejected for the reason that the location of the additional layer is indefinite. Applicant has amended these claims in a manner similar to claim 31. In addition, claim 31 is amended so that it is consistent with amended claim 11. Support for these claims is at page 4, lines 14-29.

For the above reasons, applicant respectfully requests withdrawal of the rejection under 35 USC 112, second paragraph, and entry of the amendments to the claims.

35 USC 103(b)

In paragraph 6, claims 11-27, 32 and 33 stand rejected under 35 USC 103(a) over Frost et al US 5,932,329 ("Frost") in view of Bolton et al US 4,906,703 with, as evidence, US 5,082,738 ("Swofford").

Claim 11 is directed to a glass laminate useful for blocking the transmission of IR light, comprising a multiple layer interlayer comprising: (1) two thermoplastic polymer sheets; and (2) a film positioned between the thermoplastic polymer sheets such that the film is in contact on each of its surfaces with the sheets, wherein the film can either reflect or absorb IR light, and wherein the thermoplastic polymer sheets comprise an unplasticized copolymer prepared from ethylene and α,β -unsaturated carboxylic acids having from 3 to 8 carbon atoms wherein the acid groups of the copolymer have been at least partially neutralized to yield an ethylene/ α,β -unsaturated copolymer ionomer.

Claim 33 is directed to a multiple layer interlayer article useful for blocking the transmission of infra red (IR) light comprising: (1) two thermoplastic polymer sheets; and (2) a film positioned between the thermoplastic polymer sheets such that the film is in contact on each of its surfaces with the sheets, wherein the film can either reflect or absorb IR light, and wherein the thermoplastic polymer sheets comprise an unplasticized copolymer prepared from ethylene and α,β -unsaturated carboxylic acids having from 3 to 8 carbon atoms wherein the acid groups of the copolymer have been at least partially neutralized to yield an ethylene/ α,β -unsaturated copolymer ionomer.

The general gist of the obviousness rejection is that it would have been obvious to a person of ordinary skill in the art to utilize the disclosure of Bolton in the invention of Frost to make a multilayer interlayer and glass laminate using the ionomer resin taught by Bolton to replace thermoplastic polyurethane and/or polyvinyl butyral.

Swofford is cited as describing use of silanes to enhance adhesion of ionomer to glass, polycarbonate or polyester. Reference is made to column 2, lines 18-25, and Example 1.

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Frost describes a laminate of a film with IR reflecting coating sandwiched between two thermoplastic polyurethane and/or polyvinyl butyral layers. Support films include polyethylene terephthalate. Frost describes that distortion experienced in the past with these types of laminates is reduced or eliminated if the thermoplastic polyurethane and/or polyvinyl butyral sheet on one side is at most 50 μm thick. (See, e.g., column 1, lines 58-62, column 2, lines 4-6, column 3, lines 8-33.)

Bolton describes ionomer resins, films and sheets for laminated articles. Three types of structures are described that contain plastics, and all of them are significantly different than the Frost and the invention. First, Bolton describes use of "hard coat." This can be seen at column 6, lines 14-29, wherein Bolton describes use of such hard coat in a laminate according to Figure 2. (See, also Figures 4 and 10.) Second, Bolton describes embodiments containing high impact transparent plastic layers, which are very different than the IR films of the invention. For instance, at column 6, lines 30-42, Bolton describes use of polymethylmethacrylate and polycarbonate layers. Third, Figure 13 and column 7, lines 41-53, describe an embodiment wherein a polyester film is used on the outside of a laminate to provide an anti-laceration surface.

Bolton also describes use of silane coupling agents to prime the surface to which an ionomer resin is bonded, such as at column 2, lines 48-52, and column 9, line 66-column 10, line 15. These primers are used to bond the ionomer to glass or polycarbonate. See, column 9, line 66-column 10, line 15.

Swofford describes use of silane coupling agents to improve the bonding properties of polyester films and polyvinyl butyral, polycarbonate, polyurethane, polyolefin, polystyrene and similar films. (See, e.g., column 5, lines 62-68.) The background section, at column 2, lines 27-33, describes use of a primer coating to enhance adhesion between ionomer and glass or polycarbonate, but that section then goes on to show that the focus of the patent is on improving the adhesion of polyester films and polyvinyl butyral films, particularly to prevent delamination at subfreezing temperatures. (Column 2, lines 37-49.)

All Claims

Applicant submits that the Action improperly reconstructs the invention through an improper "obvious to try" rationale, and takes the cited portion of Frost out of context so as to ignore express teachings in Frost that lead away from the claimed invention.

First, it is important that the portion of Frost cited in the Action be taken in context. The entire paragraph at column 3, lines 21-29, states:

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"Both for the extremely thin first adhesive layer and for the second adhesive layer, any of the materials known from normal laminated glass can be considered for the adhesive layers. Preferably, thermoplastic material is used, so that the usual production process can be adopted without modification. More preferably, proven materials such as thermoplastic polyvinyl butyrals and thermoplastic polyurethanes are used."

Thus, from the above, it can be seen that while Frost refers to use of "any of the materials known from normal laminated glass," Frost seems to be teaching that of those materials, thermoplastic polyvinyl butyrals and thermoplastic polyurethanes are the proven materials that should be used. Further, even if that interpretation is incorrect, certainly Frost is leading away from any other known materials.

Most importantly, Frost describes that distortion experienced in the past with these types of laminates is reduced or eliminated if the thermoplastic polyurethane and/or polyvinyl butyral sheet on one side is at most 50 μm thick. (See, e.g., column 1, lines 58-62, column 2, lines 4-6, column 3, lines 8-33.) Therefore, Frost is solving a problem specific to products containing IR films made with polyvinyl butyrals and thermoplastic polyurethanes.

Next, looking at Bolton it can be seen that there is nothing in Bolton that would teach or suggest whether the ionomer interlayers would be useful in the Frost products. Bolton is primarily focused on the nature of the ionomer resin used in laminates and does not describe anything that would be useful in determining if these ionomers can be used in the Frost products without the distortion problem that Frost tried to solve. Concerning this point, please note that Bolton's three types of polymer layers and their positions and purpose are significantly different than the IR reflective layer of the invention and Frost. For instance, Bolton describes ionomer resins, films and sheets for laminated articles. Three types of structures are described that contain plastics, and all of them are significantly different than the Frost and the invention. That is, the IR reflective layer is significantly different than the outer "hard coat", inner high impact transparent plastic layers, and outer anti-laceration polyester film layer described by Bolton. Thus, there is nothing in Bolton that would lead the person of ordinary skill in the art to conclude that the ionomers of Bolton would work satisfactorily in the Frost products. Consequently, this rejection is based on an improper "obvious to try" rationale and should be withdrawn.

In considering the above, it is important to note that Frost claims priority from an August 16, 1996 filing, which is well after the March 1990 grant date of Bolton. Moreover, from the related applications listed in Bolton, it can be seen that counterparts issued in the

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1980's. Therefore, Frost should have been well aware of the Bolton patents and their disclosure. This supports applicant's position that the Frost patent is leading away from use of ionomer.

In addition, applicant points out that the invention is not directed to use of ionomer, but to "unplasticized" sheets of ionomer. This is a very important feature of the invention since one interlayer-related problem encountered with coated IR-blocking films is that interlayers that absorb moisture and contain acidic functional groups and various ions can corrode the metal flakes or coatings that are present on some IR-blocking films. Laminates of the present invention do not contain plasticizers or other mobile components that can migrate or leach, and additionally do not promote the absorption of water. Thus the laminates of the present invention substantially reduce the occurrences of interlayer-related defects described herein.

The use of "unplasticized" sheets of ionomer as in the invention provides many benefits that are not achieved using other interlayer sheets. Unplasticized polyvinyl butyral, for example, would not be suitable for use as the interlayer which is in direct contact with the IR film because unplasticized PVB is not suitable for use in glazing due to properties such as high modulus and low tensile strength, which would negatively impact the performance of the glazing in such applications as windows and automobile windshields, for example.

Concerning this point, applicant submits that the diamines used in Bolton both crosslink and plasticize the ionomer. The addition of diamines lower the viscosity of the ionomer melt and make the polymer less stiff, and thus the diamines exhibit typical of behaviors of a plasticizer. Thus, the combination of Frost and Bolton would not lead the person of ordinary skill in the art to the invention.

For the above reasons, applicant submits that the Action is based on an improper "obvious to try" rationale. Consequently, applicant respectfully requests allowance of the claims.

Claims Reciting Priming The Film

Claim 13 is directed to a glass laminate wherein the film is primed using a priming agent prior to lamination. Claim 14 states that the priming agent of claim 13 is a silane compound or solutions thereof. Other claims depending from claim 13 are presented.

Applicant submits that the cited documents do not teach or suggest priming a film and using the primed film to bond to an ionomer interlayer material. The priming steps provide

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improved 90° peel strength. Particularly surprising results were obtained when the priming agent was applied directly to the film.

Bolton and Swofford are relied upon in the Action as showing priming. The Action points to column 6, lines 19-25 and column 7, lines 1-4 of Bolton as teaching "priming surface of plastic such as polycarbonate and of glass with silane." In addition, the Action points to Swofford at column 2, lines 18-35 and Example 1 as showing an amino silane being used to enhance adhesion of ionomer to glass, polycarbonate and polyester.

Applicant submits that Bolton doesn't teach applying primer to the surface of a film or using such a primer to enhance adhesion of such a film to an ionomer layer. Bolton describes use of silane coupling agents to prime the surface to which an ionomer resin is bonded, such as at column 2, lines 48-52, and column 9, line 66-column 10, line 15. These primers are used to bond the ionomer to glass or polycarbonate. See, column 9, line 66-column 10, line 15.

Further, applicant submits that Swofford does not teach or suggest modifying the teachings of Bolton to arrive at such an embodiment. Swofford's background section, at column 2, lines 27-33, describes use of a primer coating to enhance adhesion between ionomer and glass or polycarbonate, but that section then goes on to show that the focus of the patent is on improving the adhesion of polyester films and polyvinyl butyral films, particularly to prevent delamination at subfreezing temperatures. (Column 2, lines 37-49.) Then, Swofford describes use of silane coupling agents to improve the bonding properties of polyester films and polyvinyl butyral, polycarbonate, polyurethane, polyolefin, polystyrene and similar films. (See, e.g., column 5, lines 62-68.)

The fact that Swofford's background section refers to use of a primer coating to enhance adhesion between ionomer and glass or polycarbonate, but that column 5 refers to improving the polyester films to polyvinyl butyral, etc., and doesn't mention ionomer is very important. Given the mention of bonding to ionomer in the background and the conspicuous failure to list ionomer at column 5, the person of ordinary skill in the art can only be led to believe that Swofford was well aware of the use of ionomer in laminates, yet chose to not refer to them later on in describing the types of things that can be bonded to polyester films. Thus, Swofford leads the person of ordinary skill in the art away from the invention claimed in claim 13, and the claims dependent thereon.

Consequently, applicant submits that the cited documents do not teach or suggest priming a film and using the primed film to bond to an ionomer interlayer material. Applicant submits that Bolton is limited to teaching use of primer to bond the ionomer to glass or

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polycarbonate and Swofford teaches away from using primer to enhance bonding of ionomer to polyester films. Thus, applicant respectfully requests withdrawal of the rejection under 35 USC 103 with respect to these claims.

Claims 28-31 and 41

In paragraph 7, the Action indicates that Claims 28-31 and 41 would be allowable if redrafted in independent form and to overcome the 35 USC 112 rejection. Applicant thanks the Examiner for pointing out the allowability of these claims and have submitted amendments to overcome the 35 USC 112 rejection. Applicant has not redrafted them in independent form.

Claim 34/New Claims

Claim 34 is amended to depend from claim 33 since it doesn't recite providing glass.

New claims 42 and 43 are supported, inter alia, in Example 1.

Entry and consideration are respectfully requested.

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In view of the foregoing, allowance of the above-referenced application is respectfully requested. Should any matters remain unresolved by this response, the Examiner is invited to telephone the undersigned at the below-listed direct dial telephone number in order to expedite prosecution.

Respectfully submitted,

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